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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/720,730	12/29/2000	Koichi Watanabe	017447/0170	3938

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EXAMINER

IP, SIKYIN

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 04/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/720,730

Applicant(s)

WATANABE ET AL.

Examiner

Sikyin Ip

Art Unit

1742

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1,3-10,12,14-18 and 20-25 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-10,12,14-18 and 20-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1, 3-10, 12, 14-18, and 20-23 are rejected under 35 U.S.C. § 103 as being unpatentable over USP 5693203 to Ohhashi et al (col. 6, lines 32-63) in view of applicant's admission (Rule 132 declaration filed on April 12, 2004, items 3-4).

Ohhashi discloses the features including the claimed Nb sputtering target (col. 4, lines 61-64) and grain size (col. 6, lines 1-20). Ohhashi also discloses a sputtering target structure (Figure 1). The difference between the reference and the claims are as follows: the cited

reference does not disclose the % of grain deviation and O and/or Ta content dispersion in the target. However, sputtering target is directed to uniform microstructure which requires uniform grain size. Thus, uniform grain size meets the claimed grain size range. Ohhashi does not disclose O and Ta contents. But, applicant's admission in Rule 132 declaration, items 3-4, acknowledges that Ta and O are inevitable impurities that exist even in high purity Nb sputtering target. In view of applicant's admission, ordinary skill artisan would recognize Nb sputtering target of Ohhashi would inherently possess Ta and O as inevitable impurities. Since Ta and O are inevitable impurities, their dispersion would be uniform in Nb sputtering target. Thus, the dispersion % of said O and Ta is zero.

With respect to the dispersion % expression, that it is well settled that there is no invention in the discovery of a general formula if it covers a composition described in the prior art, *In re Cooper and Foley* 1943 C.D. 357, 553 O.G. 177; 57 USPQ 117, *Taklatwalla v. Marburg*, 620 O.G. 685, 1949 C.D. 77, and *In re Pilling*, 403 O.G. 513, 44 F(2) 878, 1931 C.D. 75.

Claims 24-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over USP 5693203 to Ohhashi et al as applied to claims above, and further in view of acknowledged prior art admission in page 2, lines 1-24.

The claimed subject matter as is disclosed and rejected above by the cited reference(s) except for the use of the Nb sputtering target. However, acknowledged prior art discloses the claimed use of the Nb sputtering target in the same field of endeavor or the analogous metallurgical art. Therefore, it would have been obvious to one having ordinary skill in the art of the cited references at the time the invention was made to use Nb sputtering target as taught by acknowledged prior art admission in order to reduce the interconnection resistance and improve

reflow characteristics of Al (See instant specification page 2, lines 20-24). In re Venner, 120 USPQ 193 (CCPA 1958), In re LaVerne, et al., 108 USPQ 335, and In re Aller, et al., 105 USPQ 233.

*Response to Arguments*

Applicant's arguments filed January 6, 2005 and argument filed May 26, 2004 have been fully considered but they are not persuasive.

Applicants argue that Ohhashi fails to recognize the reduction of Ta and O impurities. First, difference in degree of purity itself does not predicate patentability. In re King, 43 USPQ 400 and In re Merz, 38 USPQ 143. Changing form, purity, or other characteristic of an old product does not render the novel form patentable where the difference in form, purity or characteristic was inherent in or rendered obvious by the prior art. In re Cofer, 354 F2d 664, 148 USPQ 268 (CCPA 1966). Second, Ohhashi does not disclose his Nb sputtering target containing Ta or O impurities. Therefore, the Ta and/or O dispersion are zero. Third, according to applicants' declaration filed 4/12/04, that all Nb sputtering targets contain Ta and/or O, then arguendo the Nb sputtering target of Ohhashi contains Ta and/or O impurities but applicants fail to substantiate the dispersion of Ta and O in sputtering target of Ohhashi are non-uniform. Third, in view of data in instant specification that, the claimed dispersions do not have significant affect on sputtering target properties.

Applicants' argument in page 8, first paragraph of instant remarks is noted. But, examples in instant specification are intentionally adding Ta and O. There is no controlled sample to show Ta and O contents and their dispersions.

Applicants' argument in page 10, first full paragraph of instant remarks is noted. But, target No. 4 still has resistivity of interconnection higher than target No. 1 and 2.

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Moreover, target No. 7 has a dispersion % within the claimed range, but its resistivity of interconnection is much higher than targets No. 2 and 3. Moreover, as shown in instant Table 3 that O dispersion % can be as high as 80% which reads on from uniform to non-uniform O distribution. Applicants' argument as set forth in second full paragraph in page 10 of said remarks is noted. But, Table 1 in instant specification merely shows that Ta less than 3000 ppm has a relatively lower resistivity of interconnection which is inherently possessed by the high purity Nb sputtering target of Ohhashi (See Rule 132 declaration filed April 12, 2004, items 3-4). Moreover, as Table 1, targets No. 3, 5, and 6 show that dispersion % has no effect with resistivity of interconnection (3 and 6 are outside the claimed "within 30%").

Applicants' argument as set forth in page 11 of instant remarks is noted. But, the instant average grain size 100  $\mu\text{m}$  or less is overlapped by grain size no more than 350  $\mu\text{m}$  as taught by Ohhashi (col. 6, lines 42-45). Furthermore, the claimed each grain size can be ranged from 10 to 1000  $\mu\text{m}$ . The claimed grain sizes have a wide range. Therefore, the claimed grain sizes cannot be critical and claimed grain size distribution is much broader than and anticipated by grain sizes (no more than 350  $\mu\text{m}$ ) as taught by Ohhashi.

Applicants' argument as set forth in page 10 to first full paragraph of page 11 of remark filed on April 12, 2004 is noted. But, the instant claimed range "0.1 to 10 times an average grain diameter" includes 1 times an average grain diameter which is just an average grain diameter taught by reference.

#### Conclusion

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

The above rejection relies on the reference(s) for all the teachings expressed in the text(s) of the references and/or one of ordinary skill in the metallurgical art would have reasonably understood or implied from the text(s) of the reference(s). To emphasize certain aspect(s) of the prior art, only specific portion(s) of the text(s) have been pointed out. Each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combination of the cited references may be relied on in future rejection(s) in view of amendment(s).

All recited limitations in the instant claims have been met by the rejections as set forth above.

Applicant is reminded that when amendment and/or revision is required, applicant should therefore provide a concise explanation and support with page and line number in the specification for any amendments made to the disclosure. See 37 C.F.R. Part §41.37 (c)(1)(v).

**Examiner Correspondence**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Ip whose telephone number is (571) 272-1241. The examiner can normally be reached on Monday to Friday from 5:30 A.M. to 2:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Roy V. King, can be reached on (571)-272-1244.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



SIKYIN IP  
PRIMARY EXAMINER  
ART UNIT 1742

S. Ip  
April 4, 2005